MANENKOV, A.A.; POPOVA, A.A.; KHAIMOV-MAL'KOV, V.Ya.

Inhomogeneity of the crystalline field in ruby. Fiz. tver. tela 5 no.6:1643-1648 Je '63. (MIRA 16:7)

1. Fizicheskiy institut imeni Lebedeva AN SSSR, Moskva.

BREGETOVA, L.G.; POPOVA, A.I.

Temperature balance of the leaves of plants in Tajikistan. Trudy Otd. fiziol. i biofiz. rast. AN Tadzh. SSSR no.3:29-40 '63. (MIRA 16:9)

TKACHEVA, R.E.; OGORODNEVA, V.I.; DUBOVSKAYA, M.V.; MARKOVA, Ye.I.; GRIGOR'YEV, N.P.; POPOVA, A.I.; ROZIN, M.S.; OPALEV, A.I.; KIRILLOVA, L.D.[translator]; BYKHOVER, N.A., red.; SOKOLOVSKAYA, Ye.Ya., red. izd-va; BYKOVA, V.B., tekhn. red.

[Brief manual on the mineral resources of capitalist countries; Europe]Kratkii spravochnik po mineral'nym resursam kapitalisticheskikh stran; Evropa. Pod red. N.A.Bykhovera, M.V.Dubovskoi i A.F.Opaleva. Moskva, Gosgeoltekhizdat, 1962. 118 p. (MIRA 15:8)

1. Russia (1923- U.S.S.R.)Vsesoyuznyy geologicheskiy fond. (Europe, Western—Mines and mineral resources—Handbooks, manuals, etc.)

POPOVA, A.I.; DUBOVAYA-GOLOSARSKAYA, T.Ye.

Effect of X-ray therapy of malignant tumors on the heart muscle according to electrocardiographic data. Kaz. med. zhur. no.5:25-27 S-O '61. (MIRA 15:3)

1. Odesskaya basseynovaya bol'nitsa moryakov Chernomorsko-Azovskogo vodnogo otdela zdravookhraneniya (nachal'nik - Ye.S. Podurets).

(HEART--MUSCLE)
(CANCER)
(X RAYS--PHYSIOLOGICAL EFFECT)

TKACHEVA, R.E.; OGORODNEVA, V.I.; DUBOVSKAYA, M.V.; MARKOVA, Ye.I.; GRIGOR'YEV, N.P.; POPOVA, A.I.; ROZIN, M.S.; OPALEV, A.F.; Prinimali uchastiye: ANTONOVA, L.N.; MALAYEV, A.A.; BYKHOVER, N.A., red.; MAKEYEV, V.I., red. izd-va; GUROVA, O.A., tekhn. red.

[Concise handbook on mineral resources in capitalist countries; America] Kratkii spravochnik po mineral'nym resursam kapitalisticheskikh stran; Amerika. Pod red. N.A.Bykhovera, M.V.Dubovskoi i A.F.Opaleva. Moskva, Gosgeoltekhizdat, 1961. 154 p. (MIRA 15:6)

1. Russia (1923- U.S.S.R.) Vsesoyuznyy geologicheskiy fond. (America--Mines and mineral resources)

TKACHEVA, R.E.; ORORODNEVA, V.I.; DUBOVSKAYA, M.V.; MARKOVA, Ye.I.; GRIGOR'YEV, N.P.; POPOVA, A.I.; ROZIN, M.S.; OPALEV, A.F. Prinimali uchastiye: ANTONOVA, L.N.; MALAYEV, A.A.; KIRILLOVA, L.D.; SOKOLOVSKAYA, Ye.Ya., red.izd-va; BYKHOVER, N.A., red.; GUROVA, O.A., tekhn. red.

[Concise handbook on the mineral resources of capitalist countries; Asia] Kratkii spravochnik po mineral'nym resursam kapitalisticheskikh stran; Aziia. Pod red. N.A.Bykhovera, M.V.Dubovskoi i A.F.Opaleva. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po geol. i okhrane nedr, 1961. 124 p. (MIRA 15:2)
(Asia—Mines and mineral resources)

POPOVA, A.I.

On pulseless disease (Takayasu's syndrome). Terap. arkh. 32 no. 7:78-81 Jl '60. (MIRA 14:1)
(AORTA--DISEASES) (ARTERIES--DISEASES)

POPOVA, A.I.

Possibility of a clinical evaluation of ventricular extrasystolic complexes of an electrocardiogram according to their external aspects. Terap.arkh. 32 no.1:80-83 Ja '60. (MIRA 13:10)
(ELECTROCARDIOGRAPHY)

POPOVA, A.I., VASIUTINSKAYA, L.A.; PENENKOV, B.L.

Two cases of systemic scleroderma. Sov.med. 26 no.1:120-122 Ja '63. (MIRA 16:4)

1. Iz onkologicheskogo (zav. Ye.S.Podurets) i nervnogo (zav. Ye.P.Dmitriyeva) otdeleniy Basseynovoy bol'nitsy moryakov Chernomorsko-Azovskogo vodzdravotdela, Odessa.
(SCLERODERMA)

BREGETOVA, L.G.; POPOVA, A.I.

Heat resistance of the protoplasm of the representatives of various types of herbaceous plants of Tajikistan. Trudy Otd. fiziol. i biofiz. rast. AN Tadzh. SSR 2:3-107 '62. (MIRA 16:4)
(Tajikistan--Grasses) (Plants, Effect of temperature on)
(Protoplasm)

TKACHEVA, R.E.; OGORODNEVA, V.I.; DUBOVSKAYA, M.V.; MARKOVA, Ye.I.; GRIGOR'YEV, N.P.; POPOVA, A.I.; ROZIN, M.S.; OPALEV, A.F.; Prinimali uchastiye: ANTONOVA, L.N.; MALAYEV, A.A.; BYKHOVER, N.A., red.; NEKHODTSEV, N.A., red.; PANOVA, A.I., red.izd-va; IVANOVA, A.G., tekhn. red.

[Brief manual on the mineral resources of capitalist countries; Africa, Australia and Oceania]Kratkii spravochnik po mineral'nym resursam kapitalisticheskikh stran; Afrika, Avstraliia i Okraniia. Moskva, Gosgeoltekhizdat, 1962. 197 p. (MIRA 16:3)

1. Russia (1923- U.S.S.R.)Vsesoyuznyy geologicheskiy fond. (Africa--Mines and mineral resources) (Australia--Mines and mineral resources) (Oceania--Mines and mineral resources)

SOLOV'YEV, M.M.; POPOVA, A.I.

Detection of cysts of intestinal Protozoa by means of flotation with zinc sulfate. Lab. delo 7 no.1:32-34 Ja '61. (MIRA 14:1)

1. Ashkhabadskiy institut epidemiologii i gigiyeny (dir. Ye. S. Popova).
(INTESTINES—MICROBIOLOGY) (ZINC SULFATE)

POPOVA, Anastasiya Ivanovna, kand.ekon.nauk; UL'YANTSEV, P.S., red.; PULIN, L.I., tekhn.red.

[Development of the concept of collective farm property] Puti razvitiia kolkhoznoi sobstvennosti. Tula, Tul'skoe knizhnoe izd-vo, 1960. 46 p. (MIRA 14:5)
(Collective farms) (Property)

POPOVA, A.I.

Effectiveness of the bacterial destruction of solid city refuse without special chambers by the biothermic method. Gig.i san. 24 no.8:71-73 Ag '59. (MIRA 12:11)

1. Iz Rostovskoy-na-Donu gorodskoy sanitarno-epidemiologicheskoy stantsii.

(REFUSE DISPOSAL)

KOROB, M.D.; POPOVA, A.I. (Odessa)

Complex congenital abnormality of the heart. Arkh.pat. 21 no.3: 79-81 '59. (MIRA 12:12)

1. Iz vtorogo terapevticheskogo otdeleniya Odesskoy basseynovoy bol'nitsy Chernomorskogo vodzdravotdela.
(CARDIOVASCULAR DEFECTS, CONGENITAL, case reports
atresia of left atrioventric. orifice, patency of foramen ovale & anomalous location of pulm. veins (Rus))

ZOL'NIKOV, V.G.; POPOVA, A.I.

Paleogeographical study of the Quaternary period in the plain of central Yakutia. Trudy Inst. biol. IAFAN SSSR no.3:5-38 '57. (MIRA 11:5)
(Yakutia—Paleogeography)

Popova, A.I.

USSR/Microbiology - Microorganisms Pathogenic to Humans and Animals. F-5

Abs Jour : Ref Zhur - Biol., No 3, 1958, 9959

Author : Vasina, Ye.A., Popova, A.I.
Inst : -
Title : Characteristics of Non-Agglutinating Dysentery Bacteria.

Orig Pub : Zh. mikrobiol., epidemiol. i immunobiologii, 1957, No 4, 101-105

Abstract : 29 atypical Flexner cultures isolated from patients ill with acute and chronic dysentery and from healthy bacterial carriers were studied. Non-agglutinative strains among them comprised 9.2%. In their tinctorial, morphological and enzymatic properties they corresponded to typical Flexner bacilli. Of 29 strains, 23 were not lysed by a polyvalent dysentery bacteriophage. The investigated strains contained a thermolabile antigen which retarded agglutination. After boiling all the strains were agglutinated by

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VASINA, Ye.A.; POPOVA, A.I.

Characteristics of non-agglutinating dysentery bacteria. Zhur. mikrobiol.epid. i immun. 28 no.4:101-105 Ap '57. (MLRA 10:10)

1. Iz kafedry mikrobiologii Rostovskogo meditsinskogo instituta i Gorodskoy sanitarno-bakteriologicheskoy laboratorii.
(SHIGELLA DYSENTERIAE, immunol,
non-agglutinating types)

POPOVA, A. I.

7

Regeneration of metals and salts from used electrolytes. A. I. Popova and I. M. Shcherbakov [illegible]
[illegible] baths consisting [illegible] ated with Fe, Cu and [illegible] NaOH to a pH [illegible] change Fe^{++} to Fe^{+++} [illegible] and Fe. Several methods [illegible] tried without success, but [illegible] for paints [illegible] and contaminated [illegible] can be cleaned by [illegible] and [illegible] mesh [illegible]

2 5

Chem

USSR/Medicine - Buerger's Disease Jul 53

"The Effects of Intraarterial Introduction of Novocain in Obliterative Thromboangitis, (According To Electrocardiograph Data)," A. I. Popova, L. I. Katser (Odessa), Basin Hospital for Seamen

Klin Med, Vol 31, No 7, pp 57-59

Describes a modification of the N. N. Yelanskiy treatment for Buerger's disease, which involves intraarterial administration of novocain and morphine with 70% of cases reportedly recovered. In connection with the modified treatment, pre-treatment and post-treatment cardiograms were taken, and novocain injected intraarterially without morphine. States that the vasoconstrictive effect of intraarterially introduced novocain contraindicates this treatment for cases with a coronary deficiency. The general results of this investigation are uncertain. Further research and experimentation in this field are scheduled.

270T52

270T52

POPOVA, A.I.(Odessa)

A new method for registering P waves in electrocardiograms. Klin. med., 34 no.2:76-78 F '56 (MLRA 9:6)

1. Iz basseynovoy bol'nitsy moryakov (nach.-M.Z. Shpak, nauchnyy rukovoditel'-prof. A.M. Sigal)
(ELECTROCARDIOGRAPHY
registration of deflections P, new method)

BOGOMOLOV, K.S., red.; PERFILOV, N.A., red.; BELOVITSKIY, G.Ye., red.; DOBROSERDOVA, Ye.P., red.; ZHDANOV, G.B., red.; KARTUZHANSKIY, A.L., red.; LYUBOMILOV, S.I., red.; MINERVINA, Z.V., red.; RAZORENOVA, I.F., red.; ROMANOVSKAYA, K.M., red.; SAMOYLOVICH, D.M., red.; STARININ, K.V., red.; TRET'YAKOVA, M.I., red.; UVAROVA, V.M., red.; SHUR, L.I., red.; POPOVA, A.K., red.; VEPRIK, Ya.M., red.; VERES, L.F., red. izd-va; KUZNETSOVA, Ye.B., red. izd-va; POLYAKOVA, T.V., tekhn. red.

[Nuclear photography; transactions] IAdernaia fotografiia; trudy tret'ego Mezhdunarodnogo soveshchaniia. Moskva, Izd-vo Akad. nauk SSSR, 1962. 474 p. (MIRA 15:6)

1. Colloque International de Photographie Corpusculaire. 3d, Moscow, 1960. 2. Nauchno-issledovatel'skiy kinofotoinstitut, Moskva (for Bogomolov, Uvarova, Romanovskaya, Starinin). 3. Predsedatel' Organizatsionnogo komiteta Tret'yego Mezhdunarodnogo soveshchaniya po yadernoy fotografii. 1960, Moskva (for Bogomolov). 4. Zamestitel' predsedatelya Organizatsionnogo komiteta Tre'yego Mezhdunarodnogo soveshchaniya po yadernoy fotografii. 1960, Moskva (for Perfilov). 5. Radiyevyy institut im. V.G.Khlopina Akademii nauk, Leningrad (for Shur, Perfilov). 6. Institut sovetskoy torgovli im. F.Engel'sa (for Kartuzhanskiy). 7. Ob"yedinennyy institut yadernykh issledovaniy, Dubna (for Lyubomilov). 8. Institut atomnoy energii im. I.V.Kurchatova Akademii nauk SSSR, Moskva (for Samoylovich).

(Photography, Particle track)

Popova, A.K.

120-4-26/35

AUTHORS: Lonina, N.A. and Popova, A.K.

TITLE: Adhesive Application of Emulsion Layers on Glass Before Photographic Processing (Nakleyka emul'sionnykh sloyev na steklo do fotograficheskoy obrabotki)

PERIODICAL: Pribory i Tekhnika Eksperimenta, 1957, No.4, pp. 92 - 94 (USSR)

ABSTRACT: Stripped emulsion layers have been widely used for recording high-speed, charged particles (Ref.2). The article gives a detailed description of a method of "glueing" the emulsion layers onto glass before photographic processing. The cleansing of the glass and the treatment of its surface with a solution of the following composition are described: liquid glass 10 ml, gelatine 4 g, chrome alums 0.75 g, ethyl alcohol 60 ml, thymol 1 g, distilled water 1 000 ml. The solution is prepared in four stages. After 2 - 3 weeks, the emulsion layers are fixed to the prepared glass by the same solution at a temperature of 20 - 25 °C. The method was used for 10 000 cm^2 of emulsion layers, 400 - 600 μ thick. Only 8 holes were formed, occuping 2 cm^2. There are 3 references, 2 of which are Slavic.

ASSOCIATION: United Institute of Nuclear Research (Ob"yedinennyy institut yadernykh issledovaniy)

Cardl/2

120-4-26/35

Adhesive Application of Emulsion Layers on Glass Before Photographic Processing.

SUBMITTED: February 16, 1957

AVAILABLE: Library of Congress

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BERE[illegible], [illegible], red.; A[illegible]VITSEHI, [illegible], red.; MEDVEDEV, [illegible], red.; POPOVA, A.[illegible], red.; [illegible]ADUKHIN, P.A., red. [illegible], S.S., red.; S[illegible]POVA, C.I., red.

[Transactions of the Conference on the Scientific Basis of the Processes of Printing and Methods for Their Improvement] Trudy Konferentsii po nauchnym osnovam protsessov pechataniia i putiam ikh sovershenstvovaniia, Moskva, Nauchno-tekhn. ob-vo poligr. i izdatel'stv. No.1. 1961. 44 p. (MIRA 18:5)

1. Konferentsiya po nauchnym osnovam protsessov pechataniya i putyam ikh sovershenstvovaniya, Moscow, 1961.

POPOVA, A. L.

Dissertation: "Bimetallic Offset-Type Molds." Cand Tech Sci, Moscow Polygraphic Inst, 26 Apr 54. (Vechernyaya Moskva, Moscow, 14 Apr 54)

SO: SUM 243, 19 Oct 1954

SPOKOYNAYA, R.S., inzhener; POPOVA, A.M.

Small belts and light rollers from polyvinyl chloride. Tekst.prom. 14 no.2:44 F '54. (MLRA 7:5)

(Belts and belting)

SILOVA, R.G.; KUCHEROVA, G.S.; POPOVA, A.M., starshiy tekhnik; MECHIK, N.A., radiomekhanik, rukovoditel' brigady kommunisticheskogo truda; GOLUBKOV, N.I., nadsmotrshchik, udarnik kommunisticheskogo truda; MAROVICH, A.F., rukovoditel' brigady kommunisticheskogo truda

Leading workers and innovators share their experiences with communications workers. Vest. sviazi 20 no.8:15-17 Ag '60. (MIRA 13:10)

1. Brigadir telegrafistov sluzhby gorodskikh telegrafnykh svyazey TSentral'nogo telegrafa SSSR (for Silova). 2. Pomoshchnik nachal'nika 245-go otdeleniya svyazi g.Moskvy (for Kucherova). 3. Moskovskaya gorodskaya telefonnaya set' (for Popova). 4. Televizionnoye atel'ye No.38 (for Mechnik). 5. Moskovskaya gorodskaya radiotranslyatsionnaya set'. (for Golubkov). 6. Nachal'nik pochtovogo vagona Otdeleniya perevozki pochty na Kurskom vokzale v Moskve (for Marovich).
(Telecommunication--Employees)

POLYATSKIN, M.A., kand.tekhn.nauk; SHATIL', A.A., kand.tekhn.nauk;
POPOVA, A.M., inzh.

Use of the GST-L chromatographic gas analyzer for studying the combustion chambers of gas turbine systems. Energomashinostroenie 7 no.4:26-28 Ap '61. (MIRA 14:7)
(Gas turbines) (Gas--Analysis)

S/138/62/000/011/008/008
A051/A126

AUTHORS: Setkina, O.N., Popova, A.M., (deceased), Galanov, O.P.

TITLE: Determination of organic ingredients in rubber mixes and their vulcanizates by the method of ultraviolet spectra absorption

PERIODICAL: Kauchuk i rezina, no. 11, 1962, 53 - 56

TEXT: Ultraviolet spectra absorption curves of certain organic ingredients (diazoaminebenzene, Neozone D, peroxide, benzoyl, diphenylguanidine, quinodioxime, chloranil, altax, captax, thiuram), are submitted. A description is given of their extraction conditions from rubber mixes and vulcanizates based on natural sodium-butadiene, butadiene-styrene, butadiene-nitrile, chloroprene rubbers and butyl rubber. The ИСП-22 (ISP-22) spectrograph was used to photograph the spectra in a metal cuvette of varying thickness. The M.K. Ivanova hydrogen lamp system served as the ultraviolet beam source. The quantitative ingredient content was determined by comparing the extracts spectra of the raw rubber mixes and their vulcanizates. The qualitative changes of the investigated ingredients, noted in the vulcanization of butadiene-styrene rubber with diazoaminebenzene,

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are explained by the presence of Neozone D and benzoyl peroxide in the rubber. The interaction of these ingredients with diazoaminobenzene was studied: the spectrum of mix, diazoaminobenzene and Neozone D, after being heated to 143°C, acquires a "new" strip of absorption in the range of 5,000 Å, similar to that noted in the vulcanization of butadiene-styrene rubber and diazoaminobenzene. The results also showed that the appearance of the "new" strip is caused by the interaction of the diazoaminobenzene with the Neozone D, at elevated temperatures in vulcanization. An analysis of the addition spectrum, obtained from the reaction of the latter, indicated the constancy of the Neozone D structure. Conclusions: 1) By means of the ultraviolet absorption spectra, the qualitative and quantitative changes of organic ingredients in rubber mixes and vulcanizates can be determined through an analysis of the spectra of alcohol extracts from raw and vulcanized mixes; 2) the quanity of unbound ingredients introduced into the raw mixes decreases with an increase in temperature and vulcanization duration; 3) during the vulcanization of butadiene-styrene rubber and diazoaminobenzene, the reaction of the former takes place with Neozone D, included in the composition of the rubber, resulting in the formation of phenylbetadiazobenzene; 4) the ultraviolet spectra absorption method can be used in studying the vulcan-

Determination of organic ingredients in S/138/62/000/011/008/008
A051/A126

ization processes. The method described is being used in cooperation with the "Krasnyy Treugol'nik" Plant for studying commercial mixes and vulcanizates. There are 4 sets of graphs.

ASSOCIATION: Leningradskiy tekhnologicheskiy institut im. Lensoveta (Leningrad Institute of Technology, im. Lensovet)

Card 3/3

POPOVA, A. M. (Chairman of the Executive Committee of the Soviet [Council] of Working People's Deputies), PEVNEV, N. V. (Chief Veterinary Surgeon, Berdyuzhsk Rayon, Tyumen' Oblast')

"For high sanitary standards at the dairy farms"

Veterinariya, vol. 39, no. 7, July 1962 pp. 73

POPOVA A.M.

VASIL'YEV, S.S.; KOMAROV, V.V.; POPOVA, A.M.

Effective cross section of the $Be^9(n, \alpha)He^6$ reaction. Atom. energ. (MIRA 11:2)
suppl. no.5:92-93 '57.
(Nuclear reactions) (Beryllium--Isotopes)

POPOVA, A. M.

56-2-30/47

AUTHOR VASIL'YEV, S.S., KOMAROV, V.V., POPOVA, A.M.

TITLE The Effective Cross Section of the Reaction Be^9(n, 2n) (Effektivnoye secheniye reaktsii (n, 2n) na Be^9)

PERIODICAL Zhurnal Eksperim. i Teoret. Fiziki 1957, Vol 33, Nr 2 (8), pp 527 - 528 (U.S.S.R.)

ABSTRACT For natron energies of from 1,5 to 19 MeV the cross section of the reaction Be^9 (n, 2n) Be^8 and the competing reactions Be^9(n, α) He^6 and Be^9(n, t) Li^7 were determined.

1.) Be^9(n, - 2n) Be^8

En		σ	
3	MeV	~0,03	b
4	MeV	~0,1	b
5	MeV	~0,13	b
6	MeV	~0,15	b
7,5	MeV	~0,6	b
9	MeV	~1,1	b
10,5	MeV	~1,3	b
13	MeV	~0,75	b
16	MeV	~0,8	b

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POPOVA, A.M.

56-6-2/47

AUTHORS: Vasil'yev, S. S., Komarov, V. V., Popova, A. M.

TITLE: Problem of Fast Neutron Induced Disintegration of the C^{12} Nucleus Into Three α-Particles (K voprosu o raspade yadra C^{12} na tri α-chastitsy pod deystviyem bystrykh neytronov).

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1957, Vol. 33, Nr 6(12), pp. 1321-1324 (USSR)

ABSTRACT: The present paper investigates the course of the cross section of the decay of C^{12} into three α-particles, beginning from the threshold (Q = - 7,28 MeV) up to 19 MeV. Further, the authors tried to explain the dependence of the decay mechanisms on the energy of the inciding neutrons. The decay stars were observed ib photoplates НИКФИ Ya-2 and also in specially prepared layer-like emulsions with spectrally pure carbon (size of grain ~ 1 μ) as filling material. These plates were irradiated with neutrons from a thick lithium target. This lithium target was irradiated with deuterons, which were accelerated up to 4 MeV by means of a cyclotron. More than 500 stars of the decay of the C^{12} into 3 α-particles were investigated. The wide spectrum of the lithium

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Problem of Fast Neutron Induced Disintegration of the C^{12} Nucleus Into Three α-Particles 56-6-2/47

experimental data. The decrease of the cross section of the reaction $C^{12} \longrightarrow 3\alpha$ at high energies of the inciding neutrons can be explained partly by processes of direct interaction (which develop without production of a compound nucleus). With $E_n \gg 18$ MeV the angular distribution of the α-particles is anisotropic, because 70 % of α-particles fly off in a frontal direction. It is just this that tends to confirm a direct knocking out of α-particles from the C^{12} nucleus by the primary neutron. There are 2 figure, 1 table, and 4 non-Slavic references.

ASSOCIATION: Moscow State University (Moskovskiy gosudarstvennyy universitet)

SUBMITTED: June 21, 1957

AVAILABLE: Library of Congress

Card 3/3

24(5) SOV/56-35-4-22/34
AUTHORS: Komarov, V. V., Mendachin, V. G., Popova, A. M., Teplov, I. B.

TITLE: On the Stripping Mechanism in Reactions With Capture of Two Nucleons (O mekhanizme sryva v reaktsiyakh s zakhvatom dvukh nuklonov)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 4, pp 974 - 977 (USSR)

ABSTRACT: The characteristic feature of angular distribution in the stripping reactions (d,p) and (d,n) and in the pickup reactions (p,d) and (n,d) is a maximum within the range of small angles. According to experiments, the pickup process may occur also in the reactions (n,t), (d,t),(d,α), and others. The authors of this paper carried out a qualitative investigation of reactions of the type (n,t),(p,t),(n,He^3) and (p,He^3) (the reaction (p,t) on Li^7 was investigated by A.I. Baz, and A.A.Ogloblin delivered a lecture on this subject at the Moscow Conference on Nuclear Reactions,

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1957). Investigation of reactions of the general type (n,t) is carried out by two processes: a) The process of "successive stripping" (n-d-t) with the formation of deuterium in the intermediate stage, and b) Direct transition (n-t), the simultaneous capture of two nucleons. The authors investigate the angular distribution of the particles resulting from a) and b), taking account of the shell structure of the nucleus, and derive (in Born's approximation) an expression for the differential cross section, which has the following form:

$$\frac{d\sigma}{d\Omega} = \frac{M_n M_t}{4\pi^2 \hbar^4} \frac{k_t}{k_n} \frac{1}{(2S_n+1)(2J_1+1)} I^2.$$

Figure 1 shows the course of the curve for the angular distribution of a process of the type a) of the reaction Li^7 (p,t)Li^5, E_p=12 MeV and $\dot{1}$= 1.For process a) as well as for process b) the development of angular distribution is very similar to the

somewhat blurred curves characterizing the ordinary stripping process. The difference between a) and b) consists in the fact that in a) the part played in the ordinary stripping theory by the value of the orbital momentum is played here by **l** and in b) by L. Figure 2 shows the development of the angular distribution of a process b), $Li^7(p,t)Li^5$ for E_p= 12 and 35 MeV, L=0 and figure 3 shows the same for L= 2. In conclusion, the authors thank S.S. Vasil'yev for discussing the paper, and A.S.Davydov for discussing the questions raised. There are 3 figures and 15 references, 5 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

20-119-5-20/59

AUTHORS: Vasil'yev, S. S., Komarov, V. V., Popova, A. M.

TITLE: Investigation of (n,α) and (n,t) Reactions on Be^9 (Issledovaniye reaktsiy (n,α) i (n,t) na Be^9)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol. 119, Nr 5, pp. 914-917 (USSR)

ABSTRACT: The reactions $Be^9(n,\alpha)He^6$ and $Be^9(n,t)Li^7$ taking place under participation of fast neutrons with energies of from 1 to 19 MeV were observed in specially produced layered nuclear-photoemulsions with a filler of fine powder of spectrally pure beryllium. A lithium target irradiated with 4 MeV-deuterons served as neutron source. The photo-plates were inclined by 6° to the direction of the neutron beam. The irradiated and developed photoplates were checked under the microscope in order to discover two--membered stars with their center in a particle of the beryllium filler. Such stars can form by the reactions (n,α), (n,t) and (n, 2n) on Be^9 nuclei. The separation of the traces corresponding to these reactions is shortly

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discussed. Special attention was paid to the stars of the reaction (n,t) as there are no data whatever on this reaction in publications. After measuring the selected reactions $Be^9(n,\alpha)He^6$ and $Be^9(n,t)Li^7$ the calculations were carried out on the basis of the conservation theorems of energy and momentum, in order to determine the energy of the primary neutron causing this star. Besides, it was to be checked if the investigated case is correctly described by the corresponding reaction. The formula for the computation of the Energy E_n of the primary neutron in the reaction $Be^9(n,\alpha)He^6$ is put down. For the same reaction also the dependence of its cross section on the energy of the impining neutrons is mentioned. The values obtained in this coincide well with the results by P. H. Stelsen and E. C. Campbell (reference 5). This cross section has a well marked maximum within the range of energies E_n from 2 to 4 MeV. The reaction (n,α) may pass the compound nucleus Be^{10} which in this range of energy has a group of closely situated levels: 9,27 and 9,4 MeV. A further

Investigation of (n,α) and (n,t) Reactions on Be^9 20-119-5-20/59

diagram shows the angular distribution of the α-particles in the system of gravity for E_n = 2 to E_n = 5 MeV. The angular distribution does not depend on the energy of the impining neutrons and is symmetrical in relation to 90°. Also this proves the above mentioned assumption concerning the passage of a compound nucleus. The mechanism of "capturing" in the reaction (n,t) on Be^9 can be explained only hardly by a model according to which the nucleus Be^9 can be represented as a system (n,Be^8) or (n,α,α) with an odd neutron in the P-state in the external part of the nucleus. Probably in the external part of the nucleus B^9 a quasideuteron can temporarily exist. There are 3 figures and 12 references, 5 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta im. M. V.

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Investigation of (n,α) and (n,t) Reactions on Be^9 20-119-5-20/59

Lomonosova (Scientific Research Institute of Nuclear Physics of Moscow State University im. M.V. Lomonosov)

PRESENTED: December 13, 1957, by D. V. Skobel'tsyn, Member, Academy of Sciences

SUBMITTED: December 12, 1957

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SOV/120-59-1-10/50

AUTHORS: Vasil'yev, S. S., Komarov, V. V., Popova, A. M.

TITLE: Powder Loaded Nuclear Photoemulsions (Yadernyye fotoemul'sii s poroshkovymi napolnitelyami)

PERIODICAL: Pribory i tekhnika eksperimenta, 1959, Nr 1, pp 48-50 (USSR)

ABSTRACT: A description is given of a method of introducing powders into nuclear emulsions. The powders must be insoluble and must be prepared from chemically pure elements or compounds. The size of the powder particles has a lower limit equal to the size of the grains of the background. Powders have been used consisting of particles whose diameter was 1-2 μ. The powders were deposited on the surface of a nuclear emulsion which was then covered by another emulsion. The deposition of the powder was carried out in a "powder chamber" which was found to be better than the deposition by electrical means or by sedimentation from a suspension. The amount of powder-dust deposited was determined by counting the number of particles per unit area under a microscope. The accuracy

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Powder Loaded Nuclear Photoemulsions

of this method is 15%. The amount of material introduced into the emulsion in this way was between 10^{19} and 10^{20} nuclei per cm^2 of the emulsion. There are no figures, 7 references, of which 4 are Soviet and 3 French.

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki MGU (Scientific Research Institute for Nuclear Physics of the Moscow State University)

SUBMITTED: January 6, 1958.

21(7), 21(8) SOV/56-36-5-48/76

AUTHORS: Komarov, V. V., Popova, A. M.

TITLE: Direct Interaction in Reactions With the Departure of Two Nucleons (Pryamoye vzaimodeystviye v reaktsiyakh s vyletom dvukh nuklonov)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 5, pp 1574-1576 (USSR)

ABSTRACT: In the present paper the authors investigate the angular distribution for the momentum direction in the center of mass system of two nucleons, which were formed by the direct interaction between an incident nucleon and one of the nuclear nucleons in reactions of the kind (n,2n), (p,2p), (n,n'p), (p,p'n). The authors base on the assumption that the wave function of the incident nucleon (n_0) may be set up for a plane wave and that that of the nuclear nucleon (n_1), with which the former enters into interaction, corresponds to the shell model in the case of LS-coupling. The interaction of the two nucleons $V_{n_0 n_1}$ is obtained in form of a square well (radius ρ_0). For the wave function of the two

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nucleons the following is obtained by taking their interaction into account: $\psi_{2n}^{(1)} = \exp(i\vec{f}\vec{\rho}) + a\rho^{-1}\exp(-if\rho)$. $\vec{f}$ is the wave vector of the relative motion of the two nucleons, $a = -(\alpha - if)$ the scattering length, $(\alpha = (M\varepsilon\hbar^{-2})^{1/2}$, ε is the interaction energy of the nucleons. In the internal domain $(\rho < \rho_o)$ the real part of the wave function of the system has the form $\psi_{2n}^{(2)} = A\rho^{-1}\sin k'\rho$, $\vec{k}'$ is the wave vector of the relative motion within the potential well, A and k' are determined by the joining of $\psi_{2n}^{(1)}$ and $\psi_{2n}^{(2)}$ at the point $\rho = \rho_o$. For the differential cross section it holds that $\frac{d\sigma}{d\Omega} = \frac{M_o M_{2n}}{(2\pi\hbar^2)^2} \frac{k_{2n}}{k_{n_o}} \frac{1}{(2s_o+1)(2J_1+1)} |\vec{f}|^2$; M_o and M_{2n} are the reduced masses of the incident nucleons and of the system of the two interacting nucleons, k_{n_o} the momentum of the inciding nucleon

and k_{2n} the momentum of the center of mass of the system of interacting nucleons, s_o - the spin of the incident nucleon, and J_1 - the total momentum of the primary nucleus; for the matrix element I it holds that $I = \sqrt{n}\langle l^n, \alpha_1 L_1 S_1 J_1 T_1; \vec{k}_{n_o} s_o | V_{n_o n_1} | l^{n-1}, \alpha_2 L_2 S_2 J_2 T_2; \vec{k}_{2n} \vec{r}_{2n} s_{2n} \rangle$. The index 1 refers to the primary- and the index 2 to the final state of the nucleus; T is the isotopic spin. The authors numerically computed the angular distribution of the vector $\vec{k}_{2n}$ for the reaction $Be^9(n,2n)Be^8$, with the following being assumed: E_{n_o} = 14 Mev, the excitation energy for the Be^8-nucleus = 2,9 Mev, ε = 70 kev. Integration was carried out in the range of kinetic energies from 0.5 to 2 Mev. Figure 1 shows the curves of the angular distribution of $\vec{k}_{2n}$ both if $\rho = 1.0.10^{-13}$ cm and if $\rho = 2.8.10^{-13}$cm. Figure 2 for the purpose of comparison shows the experimental histogram of this angular distribution (from reference 7), which was obtained by means of a photoemulsion.

Direct Interaction in Reactions With the Departure of Two Nucleons SOV/56-36-5-48/76

The authors thank S. S. Vasil'yev for discussions and V. G. Neudachin for his valuable advice and comments. There are 2 figures and 7 references, 3 of which are Soviet.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of Moscow State University)

SUBMITTED: December 12, 1958

Card 4/4

S/048/60/024/009/010/015
B003/B063

AUTHORS: Komarov, V. V., Kurepin, A. B., Popova, A. M.

TITLE: Application of the (n,2n) Reaction in Nuclear Spectroscopy

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 9, pp. 1145-1148

TEXT: In the present article, the (n,2n) reaction is regarded as a pick-up reaction. Its application instead of the (p, d) and (n, d) reactions gives rise to the hope that data on the energy levels of nuclei can be obtained from the angular distribution curves in the ranges of medium-weight and heavy nuclei, and low energies. In these ranges, Coulomb effects play a large role and make it impossible to determine the characteristics of the energy levels with the aid of the usual pickup reactions, as was pointed out by V. G. Neudachin. A method of calculation is suggested. Its applicability is illustrated by calculating the angular distributions for the centers of mass of the two emitted neutrons from the $Be^9(n, 2n) Be^8$ reaction (Fig. 1). Bombardment of Be^9 with 14-Mev neutrons leads to the excitation of the 2.9-Mev level of Be^8 in this reaction.

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S/048/60/024/009/011/015
B003/B063

24.6810

AUTHORS: Vasil'yev, S. S., Komarov, V. V., Popova, A. M. 19

TITLE: Energy States of the Be^8 Nucleus in the Decay Reaction of the C^{12} Nucleus in Three Alpha Particles Under the Action of Protons and Neutrons

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 9, pp. 1149-1152

TEXT: The disintegration of $C^{12} \longrightarrow 3\alpha$ under the action of neutrons having energies between 8.5 and 19 Mev and of protons having energies between 15 and 30 Mev was studied in Ref. 1 and Ref. 2, respectively. The disintegration of $C^{12}(n, n'3\alpha)$ and $C^{12}(p, p'3\alpha)$ in photoemulsions bombarded with neutrons and protons of different energies was observed in the form of three- and five-pronged stars, respectively. The 72-cm cyclotron of NIIYaF MGU and the 120-cm proton synchrotron of NIIYaF MGU were used for this purpose. The analysis of the stars yielded data on the energies and the spatial distribution of the particles participating in the dis-

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Energy States of the Be^8 Nucleus in the Decay Reaction of the C^{12} Nucleus in Three Alpha Particles Under the Action of Protons and Neutrons

S/048/60/024/009/011/015
B005/B063

integration and on the excitation energies of compound nuclei (Be^8). The analysis was made by well-known methods. The bombardment technique is described in Ref. 5. Fig. 1a shows the energy distribution of alpha particles from the $C^{12}(n, n' 3\alpha)$ decay in the center-of-mass system of the C^{13} nucleus for a group of energies of the incoming neutrons. Fig. 1b shows the energy distribution of the alpha particles from the $C^{12}(p, p' 3\alpha)$ decay in the center-of-mass system of the N^{13} nucleus for four groups of energies of the incoming protons. Fig. 2a and b show excitation energies of Be^8, which were calculated for every single pair of particles in the stars observed. The experimental histogram (Fig. 2a) as a whole agrees with previous papers (Ref. 7). The data obtained (Fig. 1) indicate the possibility of a simultaneous decay reaction of C^{12} to form three alpha particles and of a strong resonance interaction of the particles in the final state. In this case, the lifetime of the Be^8 nucleus is about the nuclear life-time.

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83677

Energy States of the Be^8 Nucleus in the Decay Reaction of the C^{12} Nucleus in Three Alpha Particles Under the Action of Protons and Neutrons

S/048/60/024/009/011/015
B013/B063

There are 2 figures and 9 references: 4 Soviet and 1 Swiss.

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gos. universiteta im. M. V. Lomonosova (Scientific Research Institute of Nuclear Physics of Moscow State University imeni M. V. Lomonosov)

Card 3/3

29161 R
S/048/60/024/009/012/015
B117/B205

24.6600

AUTHORS: Komarov V. V. and Popova, A. M.

TITLE: Study of the energy distributions of products of nuclear reactions with emission of several particles

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, v. 24, no. 9, 1960, 1153 - 1156

TEXT: The authors propose a method for investigating the energy distribution of products of nuclear reactions in which several particles of medium energy are emitted. The method takes account of the interaction of particles with a small relative momentum. The parameters of interaction are taken from experimental data on the dispersion of the particles considered. The interaction of a pair of particles having a small relative momentum with the other particles is studied in Born approximation. The application of Born approximation, is, strictly speaking, not justified at such energies. Nonetheless, this procedure has been adopted successfully to explain angular and energy distributions in stripping reactions within the range of energies concerned (Ref. 4: A. G. Sitenko, Uspekhi fiz.

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Study of the energy...

nauk vyp. 3, 577 (1958)), which are similar to the process studied. If three particles are emitted and all particle pairs are able to interact in the final state, then the wave function $\Psi(t)$ must obey the Schroedinger equation for the problem in question. Interaction of the particles is obviously negligible if their relative momentum is much higher than the relative momentum of two particles corresponding to the energy of interaction of these particles. Taking account of the interaction of every pair of particles in the final state, the matrix element of the transition will assume the following form in Born approximation:

$$H \approx \langle \Psi_{123}^{A} \left[(1 - \alpha_{12}) V_{12} + (1 - \alpha_{23}) V_{23} + (1 - \alpha_{31}) V_{31} \right] \Phi_{123} \rangle$$

Ψ_{123} and Φ_{123} are wave functions of the final and the ground state; Ψ_{123} is determined for every energy range of the particle under consideration, according to the value of the relative momentum of the particles. The new method was used to study the energy distributions of He^3 nuclei from the reaction $d + T \rightarrow He^3 + n + n$ in the center-of-mass system, for angles of 25° and 75° and at energies of ~12 Mev of the incoming deuterons. The potential scat-

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Study of the energy...

tering of two neutrons in the singlet state has been taken into consideration (Ref. 5: V. V. Komarov and A. M. Popova, Zh. eksperim. i teor. fiz. 38, 253 (1960)). The constant of neutron-neutron interaction was assumed to be 70 kev. In this case, the constant could not be obtained from a comparison of the experimental data (Ref. 6: J. E. Brolley, W. S. Hall, Jr., L. Rosen, H. Stewart, Phys. Rev., 109, 1277 (1958)) with the calculated curve, since the experimental data were not exact. The method described was also used to calculate the energy distributions of neutrons from the reaction $p + d \rightarrow p + p + n$ in the center-of-mass system, between 0 and 180° and a total reaction energy of ~ 4 Mev. Pertinent experimental data have been presented in Ref. 7 (A. N. Vlasov, S. P. Kalinin, B. V. Rybakov, V. A. Sidorov, Zh. eksperim. i teor. fiz. 38, vyp. 6, 1773 (1960)). The potential scattering of every pair of nucleons produced in the reaction was taken into account. It was found that both the calculated and the experimental spectrum for neutrons emitted at an angle of 0° show two maxima. The position and shape of the maxima at a neutron energy of ~ 0.7 Mev are determined by the interaction of the neutron with the proton. The maximum at the upper boundary is due to the interaction of two protons with a small relative momentum. The cross section of the

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Study of the energy...

reaction p + d around the maximum at E_n of $\sim$0.7 Mev is larger than that around the maximum at the upper boundary of the neutron spectrum. Calculation showed that the form of the spectrum of neutrons emitted at an angle of 180° relative to the direction of the incoming protons is essentially determined by the interaction of protons with a small relative momentum. The ratio between the areas beneath the experimental points $\frac{d\sigma}{d\Omega}(180^\circ)/\frac{d\sigma}{d\Omega}(0^\circ) = 1.8 \pm 0.3$ and beneath the corresponding theoretical points $\frac{d\sigma}{d\Omega}(180^\circ)/\frac{d\sigma}{d\Omega}(0^\circ) = 1.75$ proves that the angular distributions of reaction products can be described by the new method if several particles are emitted. The "isotopic invariance" suggests that the spectrum of protons emitted at an angle of 0° by the reaction n + d → n + n + p at energies of $\sim$10 Mev of the incoming neutrons has also two maxima, just as the corresponding spectrum of neutrons from the reaction p + d → p + p + n. The first maximum appearing at a proton energy of $\sim$0.7 Mev must correspond to the interaction of neutron and proton with a small relative momentum, and the second maximum at the upper boundary of the spectrum is ascribed to the interaction between two neutrons with a small relative momentum

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Study of the energy...

The method described here permits spectrum analyses of products of the following or similar reactions: d + d; d + T; d + α; T + T. A. B. Migdal (Ref. 1: Zh. eksperim. i teor. fiz. 28, 3 (1955)) is mentioned. There are 2 figures and 10 references: 6 Soviet-bloc and 4 non-Soviet-bloc. The references to English-language publications read as follows: Ref. 2: K. Brueckner, Phys. Rev., 82, 595 (1951); Ref. 3: K. M. Watson, Phys. Rev., 88, 1163 (1952); Ref. 8: W. Heckrotte, M. Mc Gregor, Phys. Rev., 111, 593 (1958).

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gos. universiteta im. M.V. Lomonosova (Scientific Research Institute of Nuclear Physics of Moscow State University imeni M. V. Lomonosov)

Card 5/5

KOMAROV, V.V.; POPOVA, A.M.

Energy distribution in reaction products with emission of several particles. Zhur. eksp. i teor. fiz. 38 no.1:253-255 Jan '60. (MIRA 14:9)

1. Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta.

(Nuclear reactions)

83596

S/056/60/038/005/029/050
B006/B070

24.6600

AUTHORS: Komarov, V. V., Popova, A. M.

TITLE: Investigation of the Spectra of Neutrons Resulting From the Proton-induced Deuteron Decay Reaction

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 38, No. 5, pp. 1559 - 1563

TEXT: The authors calculate the energy distribution of the neutrons from the p + d → p + p' + n reaction for a total reaction energy of ~ 4 Mev, the directions of emission of the neutrons in the center-of-mass system forming angles between 0 and 180° with the direction of the incident protons. It is assumed in the calculation that at any time two of the three nucleons formed in the reaction are interacting with each other. The three-body problem can then be reduced to a two-body problem, that of a virtual biproton and a virtual deuteron symbolizing the pair of nucleons interacting with each other in the final state. The nucleon interaction is taken into account without approximation, the corresponding parameters being taken from nucleon-nucleon scattering experiments.

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83596

Investigation of the Spectra of Neutrons Resulting From the Proton-induced Deuteron Decay Reaction

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B006/B070

The interaction of the third nucleon with the virtual particle is considered in Born's approximation. The application of Born's approximation appears somewhat problematic. However, it has been utilized with success for studies of angular and energy distributions in stripping processes which are very similar to the problem investigated here. Thus, it may be assumed that in the case of interaction of a particle pair with a third particle, Born's approximation should lead to approximately correct results when the relative momenta of the particle pair are small. The orbital momentum of the p-d relative motion is assumed to be zero for the reaction studied here. The orbital momentum of the relative motion of the nucleons which arise in the reaction and unite to form a virtual biproton and a deuteron is also assumed to be zero. Then, according to the law of conservation of the total momentum of the system and the Pauli principle, the total momentum of the system is $j = 1/2$ or $3/2$, and the spin of the virtual particles is $s=0$ or 1. An expression for the differential reaction cross section is given as a function of the reduced mass of the particles, the neutron energy state density, and the transition matrix elements. The determination of the matrix

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Investigation of the Spectra of Neutrons Resulting From the Proton-induced Deuteron Decay Reaction

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elements leads to six integrals - two corresponding to the formation of the virtual biproton (I_{pp}), and four corresponding to the formation of the virtual deuteron (I_{pn}). Equations (3) and (4) give approximate expressions for I_{pp} and I_{pn}. The radial parts of the wave functions for $\varrho > \varrho_0$ and $\varrho < \varrho_0$ are also given ($\varrho_0 = 2.65 \cdot 10^{-13}$ cm). As Figs. 1 and 2 show, the numerical computations agree excellently with the experimental neutron spectra. Fig. 1 shows the spectrum of neutrons emitted at an angle zero with respect to the initial beam direction, with the incident beam of protons having an energy E_p of ~8.9 Mev. Fig. 2 shows the same for E_p = 18.6 Mev. The experimental value of the ratio of the differential cross sections is $\frac{d\sigma}{d\Omega}(180^\circ) / \frac{d\sigma}{d\Omega}(0^\circ) = 1.8 \pm 0.3$, and the theoretical value is 1.75. The applicability of this method of calculating the energy distributions of the reaction products for the clarification of the role of interactions of the particles in the final state is discussed. S. S. Vasil'yev, A. S. Davydov, Yu. M. Shirokov, N. A. Vlasov,

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83596

Investigation of the Spectra of Neutrons Resulting From the Proton-induced Deuteron Decay Reaction

S/056/60/038/005/029/050
B006/B070

and B. V. Rybakov are thanked for interest and discussions. There are 2 figures and 7 references: 5 Soviet and 2 US.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of Moscow State University)

SUBMITTED: December 8, 1959

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05689

S/056/60/038/006/032/049/XX
B006/B070

246510

AUTHORS: Komarov, V. V., Kurepin, A. B., Popova, A. M.

TITLE: The Possibility of Using the Reaction (n,2n) in Nuclear Spectroscopy

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 38, No. 6, pp. 1824-1828

TEXT: Butler has already shown that stripping and pickup reactions can be used to obtain data on nuclear energy levels. In view of this the reaction (n,2n) is now studied in the present paper; the reaction is considered a stripping reaction. In previous papers it has been shown that narrow peaks appear in the energy distributions of reaction products if several particles are emitted including two neutrons, because of the interaction of the two neutrons in the final singlet state. If the strong interaction of the neutrons with small relative energies is considered, a stripping reaction can be assumed, that is, a simultaneous emission of two neutrons in about the same direction caused by the interaction of the incident

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The Possibility of Using the Reaction (n,2n) in Nuclear Spectroscopy

S/056/60/038/006/032/049/XX
B006/B070

neutron with the nucleus. Peaks can appear in the total momentum distribution of the two emitted neutrons, corresponding to the energy levels of the nucleus A-1 in the reaction A(n,2n)A-1. It is shown by specific examples that the dependence of the areas of the peaks on the direction of motion of the center of mass of the two neutrons has the same character as in stripping and pickup reactions. It can be shown that if instead of (n,d) or (p,d) reactions (n,2n) reaction be used, the form of the angular distribution curves will give information on the characteristics of the energy levels of medium and heavy nuclei, since for such nuclei the Coulomb effects in ordinary pickup reactions have a great significance. This fact was brought to the notice of the present authors by V. G. Neudachin. The angular distribution of the center of mass of the two neutrons emitted simultaneously is calculated by taking into account their interaction in the final state. The results are discussed with the help of two examples. The angular distribution of the center of mass of the two neutrons emitted in the reaction $Be^9(n,2n)Be^8$ is calculated for the case when the incident neutron has an energy of 14 Mev. In this reaction, the final nucleus is in an excited state of 2.9 Mev. The results

S/120/61/000/001/003/062
E032/E114

AUTHORS: Vasil'yev, S.S., Komarov, V.V., Koshelyayev, G.V., and Popova, A.M.

TITLE: Production of Proton Beams of Various Energies Inside the Synchrocyclotron Chamber at Intermediate Energies

PERIODICAL: Pribory i tekhnika eksperimenta, 1961, No.1, pp.17-18

TEXT: In nuclear reaction studies employing protons of intermediate energies inside the synchrocyclotron chamber, it is convenient to use a method in which a number of targets are simultaneously irradiated by proton beams of approximately equal intensity but different energy (with sufficiently small energy spread in each beam). For this purpose the main proton beam is directed on to an internal target in the form of a wedge. In the latter the original protons are slowed down and scattered in different ways so that the protons leaving the wedge have an energy spectrum. In the magnetic field protons of different energies move over trajectories of different radii. These trajectories are intercepted by a set of slits which thus define a number of proton beams of different energies. The slits are located on the bottom

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S/120/61/000/001/003/062
E032/E114

Production of Proton Beams of Various Energies Inside the Synchrocyclotron Chamber at Intermediate Energies

of the chamber and are arranged in such a way that they let through only those protons which are scattered at small angles in the downward direction but are practically unscattered in the horizontal plane. This method has been used in nuclear reaction studies using the 120 cm synchrocyclotron of the Scientific Research Institute of Nuclear Physics of the Moscow State University (Nauchno-issledovatel'skiy institut yadernoy fiziki MGU) (initial proton energy 30 MeV). The wedge was made of copper and had an angle of 40°. The intercepting slits were 3 mm wide each and defined 9 proton beams in the energy range 7.5-30 MeV. The energy spread in each channel was smaller for the smaller energies. The nine beams were allowed to strike nuclear emulsions at an angle of 6°. In order to obtain approximately equal intensities in the 9 channels the working part of the wedge was made approximately equal to the radial half-width of the synchrocyclotron beam.

There is 1 figure.
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S/120/61/000/001/003/062
E032/E114

Production of Proton Beams of Various Energies Inside the Synchrocyclotron Chamber at Intermediate Energies

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki MGU
(Scientific Research Institute of Nuclear Physics, MGU)

SUBMITTED: December 10, 1959

Card 4/4

31771
S/056/61/041/006/011/054
B113/B104

24.6500

AUTHORS: Vasil'yev, S. S., Komarov, V. V., Popova, A. M.

TITLE: Investigation of the reaction $C^{12}(\alpha, 4\alpha)$

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41, no. 6(12), 1961, 1757-1760

TEXT: The authors studied the decay of the C^{12} nucleus into 3 α-particles induced by a 23-Mev α-particle. The α-particles were accelerated on the 120-cm cyclotron of the NIIYaF MGU, the reactions took place in НИКФИ (NIKFI)-type nuclear emulsion plates of 50-400 μ thickness: Я 2 (Ya2), Т-1 (T-1), Т-2 (T-2), Т-3 (T-3), and Д (D). The following mechanisms are possible:

$$C^{12} + \alpha \to O^{16*} \to C^{12*} + \alpha \to Be^{8} + 2\alpha \to 4\alpha, \quad (1),$$

$$C^{12} + \alpha \to O^{16*} \to C^{12*} + \alpha \to 4\alpha, \quad (2),$$

$$C^{12} + \alpha \to O^{16*} \to Be^{8} + Be^{8} \to 4\alpha, \quad (3),$$

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Investigation of the reaction ...

$$C^{12} + \alpha \rightarrow O^{16*} \rightarrow Be^{8} + 2\alpha \rightarrow 4\alpha, \quad (4),$$

$$C^{12} + \alpha \rightarrow O^{16*} \rightarrow 4\alpha, \quad (5),$$

$$C^{12} + \alpha \rightarrow C^{12*} + \alpha \rightarrow Be^{8} + 2\alpha \rightarrow 4\alpha, \quad (6),$$

$$C^{12} + \alpha \rightarrow C^{12*} + \alpha \rightarrow 4\alpha. \quad (7).$$

To determine the probability of these reaction modes, the authors studied the excitation energy of the C^{12} and Be^{8} compound nuclei, the angular and energy distribution of the α-particles. The weight of the true values E_{exc} (C^{12}) must amount to 1/4 if the reaction proceeds according to mechanisms (1) or (2). The distribution of the calculated values E_{exc} (C^{12}) was also measured. Mechanisms (1) and (2) proved to be very unlikely. The probability of the modes (3), (4), (5) in the decay of the C^{12} nucleus is determined from the energy distribution of the resulting α-particles. If the reaction proceeds through a straight decay of the O^{16*} compound nucleus into four independent particles, the energy distribution of the resulting α-particles must satisfy the formula:

Investigation of the reaction ...

$F(E_\alpha) = E_\alpha^{1/2} \cdot (E_{max} - \mu \cdot E_\alpha)^{1/2}$. A comparison of the curve obtained from this formula with the curve for the case where the compound nucleus O^{16*} decays into two Be^8 nuclei, and the latter into two α-particles each, showed that mode (3) was unlikely. Most probable is the formation of an O^{16*} compound nucleus decaying into four α-particles with resonance interaction between the α-particles in the ground state. There are 2 figures and 5 Soviet references.

SUBMITTED: June 27, 1961

Card 3/3

27477
S/048/61/025/009/002/007
B104/B102

24.6400

AUTHORS: Vasil'yev, S. S., Komarov, V. V., and Popova, A. M.

TITLE: Properties of the lower states of the Li^5 and Be^8 nuclei produced in decays of light nuclei

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 25, no. 9, 1961, 1117 - 1120

TEXT: This paper was read at the 9th Annual Conference on Nuclear Spectroscopy. It deals with the question how the influence of interaction of reaction products in the final state can be taken into account when studying the integral energy distribution of particles produced by direct decay of a compound nucleus. The differential cross section of the decay of a compound nucleus with spin I and parity π into n particles with the energies E_i and the momenta $\vec{p}_i$ can be written as

$$d\sigma \sim \delta\left\{\sum_{i=1}^{n} (E_i - E)\right\} \delta\left(\sum_{i=1}^{n} p_i\right) \prod_{i=1}^{n} d^3 p_i \left|H_{ab}\right|^2 ,$$

Card 1/4

cross section is written as $\frac{d\sigma}{dE_i} \sim f(E_i) \frac{\sin^2(\delta + \Phi)}{q^2}$. If a simultaneous interaction between two pairs of particles in the final state is possible, the differential cross section acquires the form

$$\frac{d\sigma}{dE_i} \sim f(E_i) \frac{\sin^2(\delta_1 + \Phi_1)}{q_1^2} \cdot \frac{\sin^2(\delta_1 + \Phi_2)}{q_2^2} \qquad (6).$$

This is illustrated by a study of the energy distribution of protons from the decay of C^{12} into three alphas induced by 15 - 30 Mev protons. A previous paper by the authors (S. S. Vasil'yev et al., Izv. AN SSSR, Ser. fiz., 24, 1145 (1960)) has shown that four- and three-particle decays of C^{12} may be accompanied by interactions of two alphas at the levels 0, 2.9, and 11.8 Mev of the Be^8 nucleus, and by an α- p interaction at the ground level of the Li^5 nucleus. This indicates that Li^5 and Be^8 occur, not as

S/056/62/043/003/001/063
B125/B102

AUTHORS: Vasil'yev, S. S., Komarov, V. V., Popova, A. M.

TITLE: Study of decay reactions of carbon and oxygen nuclei under the action of 15-29-Mev protons

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 3(9), 1962, 737-748

TEXT: The energy distribution of the products of the reactions C^{12} $(p,p'3\alpha)$ and $O^{16}(p,p'4\alpha)$ was determined from 5 and 6-pronged stars in photographic plates. These plates were irradiated in the 120-cm synchrocyclotron of the Institut yadernoy fiziki MGU (Institute of Nuclear Physics of MGU). For $C^{12}(p,p'3\alpha)$ reactions and with 15 Mev $\leq E_p \leq$ 29 Mev the following reaction mechanisms are possible:

Study of decay reactions of ...

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$C^{12} + p \rightarrow N^{13*} \rightarrow C^{12*} + p \rightarrow Be^8 + \alpha + p \rightarrow 3\alpha + p,$
$C^{12} + p \rightarrow N^{13*} \rightarrow C^{12*} + p \rightarrow 3\alpha + p,$
$C^{12} + p \rightarrow N^{13*} \rightarrow B^9 + \alpha \rightarrow Be^8 + \alpha + p \rightarrow 3\alpha + p,$
$C^{12} + p \rightarrow N^{13*} \rightarrow B^9 + \alpha \rightarrow Li^5 + 2\alpha \rightarrow 3\alpha + p,$
$C^{12} + p \rightarrow N^{13*} \rightarrow B^9 + \alpha \rightarrow 3\alpha + p,$
$C^{12} + p \rightarrow N^{13*} \rightarrow Be^8 + Li^5 \rightarrow 3\alpha + p,$
$C^{12} + p \rightarrow N^{13*} \rightarrow Be^8 + \alpha + p \rightarrow 3\alpha + p,$
$C^{12} + p \rightarrow N^{13*} \rightarrow 2\alpha + Li^5 \rightarrow 3\alpha + p,$
$C^{12} + p \rightarrow N^{13*} \rightarrow 3\alpha + p,$
$C^{12} + p \rightarrow C^{12*} + p \rightarrow Be^8 + \alpha + p \rightarrow 3\alpha + p,$
$C^{12} + p \rightarrow C^{12*} + p \rightarrow 3\alpha + p,$
$C^{12} + p \rightarrow B^9 + \alpha \rightarrow Be^8 + \alpha + p \rightarrow 3\alpha + p,$
$C^{12} + p \rightarrow B^9 + \alpha \rightarrow 2\alpha + Li^5 \rightarrow 3\alpha + p,$
$C^{12} + p \rightarrow B^9 + \alpha \rightarrow 3\alpha + p.$

(1)-(14)

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Study of decay reactions of ...

In these reactions Be^8 may be formed. At excitation energies of the Be^8 nucleus from 0 to 15 Mev only the wide levels 2.9 ± 1.5 Mev and 11.3 Mev occur. At this E_p of the C^{12} nuclei there is only a very low decay probability, according to the mechanisms (1), (2) and (10), (11), with production of the first compound nucleus C^{12*}. In the reaction $C^{12}(p,p'3\alpha)$ the probability that B^9 will be produced as the first compound nucleus is 20% (mechanisms (12), (13) and (14)). The probability of the mechanisms (3) and (5) is low. The hypothetic mechanisms for the direct decay of the compound system N^{13*} in 2, 3 or 4 noninteracting particles are not confirmed by the experimental energy distributions. At 15 Mev $\leq E_p \leq$ 29 Mev the reaction $C^{12}(p,p'3\alpha)$ very probably proceeds by way of a direct nuclear decay of a compound system into three α particles and one proton. These final particles react in pairs. In the reaction $O^{16}(p,p'4\alpha)$ the compound nucleus F^{17} decays into 4α+p. These particles resonance-interact in the ground states of the nuclei Li^5 (ground-state) and Be^8 (ground-state, 30-40% probability; excited states 2.9 ± 1.5 Mev, 50%; 11.3 ± 0.3 Mev, 10-20% probability). There are 8 figures and 2 tables.

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L 16888-63 EWT(m)/BDS AFFTC/ASD S/0056/63/045/002/0214/0227

ACCESSION NR: AP3005271 55 52

AUTHOR: Komarov, V. V.; Popova, A.M. 19

TITLE: Investigation of nucleon-induced deuteron disintegration by the diagram, summation method

SOURCE: Zhur. eksper. i teorot. fiz., v. 45, no. 2, 1963, 214-227

TOPIC TAGS: deuteron disintegration, three nucleon interactions, interaction amplitude, diagram technique, pole diagram, triangular diagram

ABSTRACT: A diagram summation technique is used to derive integral equations for the three-nucleon interaction amplitudes, such as the emplitude of deuteron disintegration induced by nucleons. In order to see which types of processes are taken into account in the various approximation, the first diagrams of corresponding oo the first iterations of the equations are considered ahd their contribution calculated in analytic form. An exact correspondence is established between the contributions of the first diagrams and the results previously obtained by the authors in the first perturbation-theory approximation by talding into account final-state particle interactions, which correspond to contributions from pole and triangular

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ACCESSION NR: AP3005271 3

diagrams. The results are extended to include the case of real nucleons with spin and isotopic spin. It is concluded that in the zeroth approximation in the interaction radius the amplitude of the Nd interaction corresponds only to ladder-type diagrams, which are easy to sum and yield results already known, and the results of the summation technique agree also with the first-order approximation results. The greatest contributions appear to come from pole and triangular diagrams. Extension of the procedure to more than three nucleons is suggested. "In conclusion, the authors are grateful to K. A. Ter-Martirosyan for interest and useful discussions, and to G. S. Danilov, who reviewed the paper and made several comments. Orig. art. has 8 figures and 39 formulas.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics, Moscow State University)

SUBMITTED: 11Nov62 DATE ACQ: 06Sep63 ENCL: 00

SUB CODE: PH NO REF SOV: 006 OTHER: 003

Card 2/2

ACCESSION NR: AP3009486 S/0188/63/000/005/0018/0023

AUTHOR: Komarov, V. V.; Popova, A. M.

TITLE: A diagrammatic method for determining the nucleon-nucleon scattering amplitude

SOURCE: Moscow. Universitet. Vestnik. Seriya 3. Fizika, astronomiya, 18, no. 5, 1963, 18-23

TOPIC TAGS: nucleon, nucleon-nucleon scattering, scattering amplitude, nucleon scattering amplitude, perturbation theory, Bethe-Peierls equation

ABSTRACT: Equations for the nucleon-nucleon scattering amplitude have been set up by summing the infinite series of perturbation theory diagrams. For simplicity, the case of two spinless particles in the proximity of the zero-range of nuclear forces is considered. Various types of diagrams are given for the transformation of two nucleons into two nucleons, describing the creation and annihilation of deuterons. Proceeding from the expression for the S-matrix and substituting nucleon creation and annihilation operators and suitable deuteron creation and annihilation operators, the values of the contributions of these diagrams which describe the interaction are determined. These values were previously used by the authors to determine the scattering amplitude of three or more nucleons

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ACCESSION NR: AP3009486

(ZhETF, No 7, 1963). The equations obtained for the scattering amplitude of two

$$a(k) = -(\sqrt{mE_0} + i\sqrt{mE})^{-1}. \qquad (22)$$

nucleons are in full agreement with the similar Bethe-Peierls equation for the nucleon-nucleon S-scattering amplitude in the proximity of the zero-range of nuclear forces and the Schroedinger wave equation, respectively.

ASSOCIATION: NIIYaF Sci. Res Inst Nuclear Physics ?

SUBMITTED: 15Jan63 DATE ACQ: 08Nov63 ENCL: 00

SUB CODE: PH, NS NO REF SOV: 002 OTHER: 000

Card 2/2

KOMAROV, V. V.; POPOVA, A. M.

"The Diagram Method of Investigation of the Few Nucleon Systems."

report submitted for All-Union Conf on Nuclear Spectroscopy, Tbilisi, 14-22 Feb 64.

MGU (Moscow State Univ)

KOMAROV, V. V.; POPOVA, A. M.

"The Non-Relativistic Three-Body Problem."

report submitted for All-Union Conf on Nuclear Spectroscopy, Tbilisi, 14-22 Feb 64.

Moscow State Univ.

ACCESSION NR: AP4019222 S/0056/64/046/002/0568/0577

AUTHORS: Ivanter, I. G.; Popova, A. M.; Ter-Martirosyan, K. A.

TITLE: Behavior of the cross section for the inelastic process a + b → c + d + e at high energies

SOURCE: Zhurnal eksper. i teor. fiz., v. 46, no. 2, 1964, 568-577

TOPIC TAGS: inelastic scattering, high energy scattering, Regge pole, genuine inelastic collisions, almost elastic collisions, single Regge pole approximation, asymptotic reaction amplitude

ABSTRACT: Conversion of two particles into three is investigated in the region of very high energies, on the basis of the results of an analysis of the asymptotic amplitudes of the inelastic processes (K. A. Ter-Martirosyan, ZhETF v. 44, 341, 1963; Nuclear Phys., in press. A. M. Popova and K. A. Ter-Martirosyan, Nuclear Phys., in press). The results are based on the assertion that, if only the

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contribution of the Regge pole on the extreme right is included, then the asymptotic behavior is determined solely by the contributions from simple diagrams very similar to Feynman diagrams. The total cross section for the reaction consists of three terms, of which one determines the contribution from small momenta of particle d, the second makes a small contribution when the energy is very large and corresponds to events having a "shower" character, when both ultrarelativistic particles c and d are emitted in a narrow cone in the direction of the colliding particles and the momentum of particle c is much larger than the momentum of particle d. The last term corresponds to the case when the momenta of the particles c and d are almost parallel and their magnitudes are of the same order, corresponding to "almost elastic" collisions, whereas the collisions of the first two types are "genuine elastic collisions." The total cross section is found to have an energy dependence of the form $[c_1 \ln [\ln(s/m^2)] + c_2]/\ln(s/m^2)$ (s -- energy, m -- mass).

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The largest contribution to the cross section corresponds to the case of the so-called "genuine inelastic" collisions. In this case one of the two particles with the same direction has a much larger momentum than the other particle. Orig. art. has: 29 formulas and 4 figures.

ASSOCIATION: None

SUBMITTED: 21Jun63	DATE ACQ: 27Mar64	ENCL: 00
SUB CODE: PH	NO REF SOV: 003	OTHER: 004

Card 3/3

ACCESSION NR: AP4031151 S/0056/64/046/004/1295/1306

AUTHORS: Verdiyev, I. A.; Popova, A. M.; Ter-Martirosyan, K. A.

TITLE: Production of four and five particles as a result of collisions at high energy

SOURCE: Zh. eksper. i teor. fiz., v. 46, no. 4, 1964, 1295-1306

TOPIC TAGS: particle production, high energy particle, particle interaction, inelastic scattering, asymptotic property

ABSTRACT: Asymptotic expressions previously derived (K. A. Martirosyan, preprint, ITEF, 1963) for "truly inelastic" processes are used for the determination of the most likely momentum configurations in reactions in which two particles are transformed into four or five particles at high energies. The earlier research was devoted to transformation of two into three particles. A general method of integrating over the momenta of the generated particles (particularly

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ACCESSION NR: AP4031151

over the transverse momentum components) and for determining the most important momentum configuration is obtained. The general form of the energy distribution of the particles is obtained, and it is shown that if 4 or 5 groups of such particles are produced, then these particles are emitted in the c.m.s. of the reaction inside a narrow cone about the initial direction, so that the total momenta of the particles within the different groups differ significantly in magnitude. The total cross sections of the reactions are obtained by taking into account the contribution of only one pole in the j-plane. Orig. art. has: 5 figures and 41 formulas.

ASSOCIATION: None

SUBMITTED: 03Sep63 DATE ACQ: 07May64 ENCL: 00

SUB CODE: NP NR REF SOV: 004 OTHER: 001

Card 2/2

ACCESSION NR: AP4037583 S/0056/64/046/005/1700/1714

AUTHORS: Verdiyev, I. A.; Kancheli, O. V.; Matinyan, S. G.; Popova, A. M.; Ter-Martirosyan, K. A.

TITLE: Complex asymptotic expressions for inelastic processes amplitudes and singularities in the angular momentum plane

SOURCE: Zh.eksper. i teor. fiz., v. 46, no. 5, 1964, 1700-1714

TOPIC TAGS: asymptotic solution, inelastic scattering, Regge pole, moving pole method, high energy particle

ABSTRACT: A previously developed momentum integration technique for a small number of particles (ZhETF v. 46, 568 and 1295, 1964) is used to calculate the total cross sections for the production of n particles (or n groups of particles having a low particle energy in the c.m.s. of each group) and the energy distribution of the particles in high-energy inelastic collisions. The values previously obtained

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ACCESSION NR: AP4037583

for the most important "genuinely inelastic" collisions, corresponding to the contribution of an isolated vacuum Regge pole, are used to determine the asymptotic amplitudes. It is assumed that all particles are identical and have no isospin. It is shown that for any inelastic process there is a definite particle momentum configuration making the most significant contribution to the amplitude. The distributions of these particles with respect to the logarithms of their momenta are determined and are found to depend on the behavior of the vertex functions. Unitarity in the s-channel for the zero-angle elastic-scattering amplitude is shown to be violated if these vertex functions do not decrease with decreasing squares of the reggeon momenta. The dependence of both halves of the s-channel unitarity condition for elastic scattering at nonzero angle on the momentum transfer is investigated, and it is shown that the right half of this condition does not represent the Regge asymptotic amplitude corresponding to the vacuum pole if the terms corresponding to the production of an arbitrary number of particles are taken into

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account. The momentum-transfer dependence can be duplicated only if all asymptotic contribution from all the branch-point singularities on the right of the vacuum point, condensing toward the point j = 1, are taken into account. Orig. art. has: 48 formulas.

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki (Institute of Theoretical and Experimental Physics); Institut fiziki Akademii nauk Gruzinskoy SSR (Institute of Physics, Academy of Sciences, Georgian SSR); Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Nuclear Physics Institute, Moscow State University)

SUBMITTED: 03Sep63 DATE ACQ: 09Jun64 ENCL: 00

SUB CODE: NP NR REF SOV: 004 OTHER: 003

Card 3/3

ACCESSION NR: AP4042576 S/0056/64/046/006/2112/2125

AUTHORS: Komarov, V. V.; Popova, A. M.

TITLE: The four body problem at low energies

SOURCE: Zh. eksper. i teor. fiz., v. 46, no. 6, 1964, 2112-2125

TOPIC TAGS: perturbation theory, Feynman diagram, nonrelativistic particle, nucleon, particle interaction, particle scattering, scattering amplitude, n body problem

ABSTRACT: The analysis is based on the summation of an infinite series of nonrelativistic diagrams, such as is used for a description of the two-body and three-body problem by the authors previously (Vestnik MGU, ser. III, No. 5, 18, 1963; ZhETF, v. 45, 214, 1963; Nucl. Phys., in press; Vestnik MGU, No. 5, 1964). Integral equations are written for the amplitude of the reactions of interaction of four nucleons under the assumption that only two-body forces are signifi-

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ACCESSION NR: AP4042576

cant. It is shown that the equations for the reaction amplitudes, in which the final state consists of two pairs of interacting particles, are coupled to those in which there are three interacting particles. The kernels of these equations contain the amplitude for three-nucleon interactions in the same manner as the kernel for the equation for the three-nucleon interactions contain the two-nucleon scattering amplitude. As in the case of the previous investigation of nucleon-deuteron scattering, it is possible to represent the amplitudes of the different processes of four-nucleon interaction in the form of contributions from an infinite sum of diagrams. An investigation of the structure of these contributions makes it possible to write down integral equations for the amplitudes of the reactions. For the sake of simplicity it is assumed that the particles possess neither spin nor isospin, but generalization to the case of particles with spin entails no difficulty in principle, and can be carried out by the method which the authors have used to solve the three-body problem. It is planned in the future to obtain integral

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ACCESSION NR: AP4042576

equations for amplitudes of interaction of four nucleons for specific cases of reactions. It is pointed out that the diagram method can also be used in the investigation of five-nucleon interactions. Integral equations can also be obtained for the interaction amplitude of more nucleons, making it possible to construct wave functions for light nuclei and to produce in this manner a model-free theory of light nuclei. "The authors thank K. A. Ter-Martirosyan for suggesting the topic and for a discussion of the results." Orig. art. has: 3 figures and 32 formulas.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Nuclear Physics Institute, Moscow State University)

SUBMITTED: 16Dec63 DATE ACQ: ENCL: 00

SUB CODE: NP NR REF SOV: 004 OTHER: 001

Card 3/3

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001342420014-0"

POPOVA, A.M.; PEVNEV, N.V.

For high hygienic standards on dairy farms. Veterinariia 39 no.7:76-77 Jl '62. (MIRA 18:1)

1. Predsedatel' ispolnitel'nogo komiteta Soveta deputatov trudyashchikhsya Berdyuzhskogo rayona Tyumenskoy oblasti (for Popova). 2. Glavnyy veterinarnyy vrach Berdyuzhskogo rayona Tyumenskoy oblasti (for Pevnev).

POPOVA, A. N.

Dragonflies

Dragonflies(Odonata) of Tajikistan. Trudy Zool. inst. AN SSSR., 9 No. 3, 1951

9. Monthly List of Russian Accessions, Library of Congress, May 1952, Uncl.

POPOVA, A.N.

[Larvae of dragonflies (Odonata) in the U.S.S.R.] Lichinki strekoz fauny SSSR (Odonata). Moskva, Izd-vo Akademii nauk SSSR, 1953. 234 p. (Opredeliteli po faune SSSR no.50) (MLRA 6:12)
(Dragonflies) (Larvae)

POPOVA, A.N.

PAVLOVSKIY, Ye.N., akademik, redaktor; VINOGRADOV, B.S., redaktor; ARNOL'DI, L.V.; BEY-BIYENKO, G.Ya.; BORKHSENIUS, N.S.; VINOGRADOV, B.S.; GUTSEVICH, A.V.; KIRICHENKO, A.N.; KIR'YANOVA, Ye.S.; KOZHANCHIKOV, I.V.; LEPNEVA, S.G.; LIKHAREV, I.M.; MALEVICH, I.I.; NOVIKOV, G.A.; POPOV, V.V.; POPOVA, A.N.; SOCHAVA, V.B.; STARK, V.N.; TERENT'YEV, P.V.; KHARITONOV, D.Ye.; CHERNOV, V.B.; SHAPOSHNIKOV, G.Kh.; SHTAKEL'BERG, A.A.; YUDIN, K.A.

[Animal life of the U.S.S.R.] Zhivotnyi mir SSSR. Vol.4 [Forest zone] Lesnaia zona. Moskva, Izd-vo Akademii nauk SSSR, 1953. 737 p. (MLRA 7:3)
(Forest fauna) (Zoology)

Popova, A. N.

BELYSHEV, B.F.

"Larvae of dragonflies (Odonata) in the U.S.S.R."; guides to the fauna of the U.S.S.R., no.50. A.N.Popova. Reviewed by B.F.Belyshev. Zool.zhur. 34 no.3:697-698 My-Je '55. (MLRA 8:8)
(Dragonflies) (Popova, A.N.) (Larvae)

POPOVA, A. N.

Bc

B-II-1

Synthesis of urea from ammonia and carbon dioxide. I. B. A. Bolotov and A. N. Popova (J. Chem. Ind. Russ., 1934, 10, No. 9, 32—38).—Max. (47%) yields of urea are obtained by heating 2 : 1 NH_3-CO_2 at 195°/230 atm. for 30 min. Slightly higher yields are obtained from dry than from damp CO_2, by taking a 10—15% excess of NH_3, and by prolonging the reaction time to 2 hr. Corrosion of the walls of the reaction vessel augments rapidly with rising temp. and increasing pressure, the most refractory metal being non-rusting steel containing Cr 8—11 and Si 2—3%. A plant for the above process is described.

R. T.